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04M-2-1

Approved For Release 2001/03/05 : CIA-RDP78-05927A000100040099-7

30 August 1973

**MEMORANDUM FOR THE RECORD**

**SUBJECT: ERTS Coverage Indexes**

**1. Purpose**

The object of this memorandum is to evaluate an offer by an official of the United States Geological Survey (USGS) to provide free Earth Resources Technology Satellite (ERTS) photography in exchange for plotting of ERTS coverage indexes.

**2. Utilization**

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ERTS photography is currently utilized only in the [REDACTED] Project and, as exchange material, in the Map Procurement Program. The 7-band capability (3 Return Beam Vidicon and 4 Multi-Spectral Scanner bands) and frequent coverage of ERTS are proving most useful in combination with other materials of higher resolution.

Potential Agency usage would probably be confined to small-scale interpretations of land use, vegetation, physiography and drainage. Agency geographers will be able to estimate agricultural yields, observe the effects of weather, assess natural disasters, and better describe the spatial characteristics of a study area. Cartographers will be able to construct accurate maps of the cloud-covered equatorial regions. Faster and truer depiction of landforms and orthophotomaps will also be possible.

**3. Background**

Photo coverage can be depicted by either cellular approximation or actual extent. A matrix of positionally known cells is matched in the computer against the coverage in the first technique. Cells more than half occupied are shown as covered. This method, employed for COMIREX and OSP, is best for planning and operational purposes on smaller-scaled maps. The latter technique may either show the limits of each frame or just the camera swath. Photogrammetrists, interpreters and cartographers are better served by the absolute coverage shown at larger scales.

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In the case of ERTS coverage, the camera swath and individual frames along the swath are repeated every 18 days. Similar frames on all orbits photograph the same real estate with less than 10% deviation. By better trimming of the satellite this can be reduced to 5%. Therefore, it can be assumed that the frame outlines are fixed and their plotting would be a one-time effort. These could be placed on transparencies as an overlay to plots showing cloud cover and quality of each frame every 18 days.

Strong interest in cell plots was expressed by USGS officials. They felt that by reducing ERTS coverage to the same comparable graphic system employed by COMIREX, domestic, military and intelligence users would all profit. But, since this would involve the labors of 2 to 3 OSP programmers for 6 to 9 months to set up an area history file, it was decided that this would be of lower priority than the indexes to frames.

#### 4. Project Requirements

As described above, there are two levels to this project -- frame and cell indexing. If the Agency were to support either or both indexes, the following steps and resources would be involved:

##### a. Frame Index

- Planning - index design, procedures
- Programming - format conversion routines, file creation
- Testing and Evaluation
- Computer processing
- Map plotting
- Map finishing

At this level, only the index design and the plotting would require Agency resources. A series of continental maps showing frames and reference numbers would be a one-time effort. USGS, which has our plot programs resident on similar IBM computers, could generate the frame index and, every 18 days, the cloud cover/quality plots. After the index plots of perhaps 12 man-hours, the subsequent coverage plots would probably take less than 2 hours every 18 days. Plotting capability may also become available in the Survey by the end of FY 1974, but not later than FY 1975 according to their planners. Accordingly, this support would not extend beyond FY 1975. The map finishing would be done by the USGS.

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b. Cell Index

Planning - procedures  
Programming - creation of area history file  
Computer processing  
Map plotting  
Map finishing

Because this is an existing graphic system, the major burden would fall on OSP to create a new file (1 - 2 man-years) and on OJCS to process it. Because of the massive computer core required, servicing would have to continue in CIA. The same comments on plotting and finishing cited in a., above would apply.

5. Advantages and Disadvantages

a. The benefits of the project are threefold, as follows:

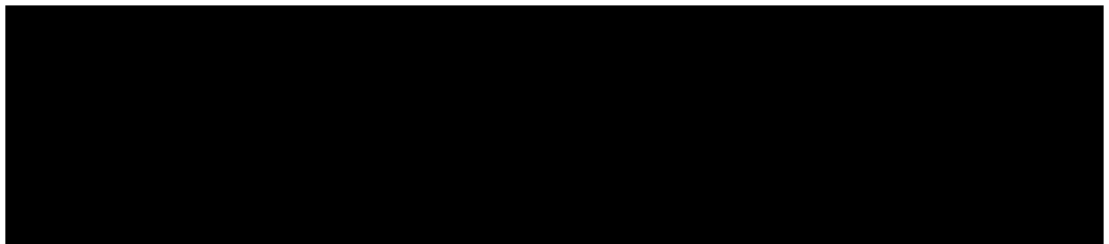
(1) Improved Indexing -- The current graphic indexes to coverage (sample attached) are very poor and often inaccurate. Adoption of existing Agency techniques and the use of the Cartography Division automatic plotter would not only help to improve another agency's product, but would directly benefit CIA users.

(2) Demonstration Project -- Except for infrequent planning exercises, the frame type of coverage diagram has been made manually. The USGS proposal, therefore, offers a good demonstration project that may upgrade current Agency methods.

(3) Free Photography -- The provision of free photography on a preferred basis is desirable. However, the amount currently procured is small and the time factor is not critical.

b. The two following disadvantages to the Agency have been identified:

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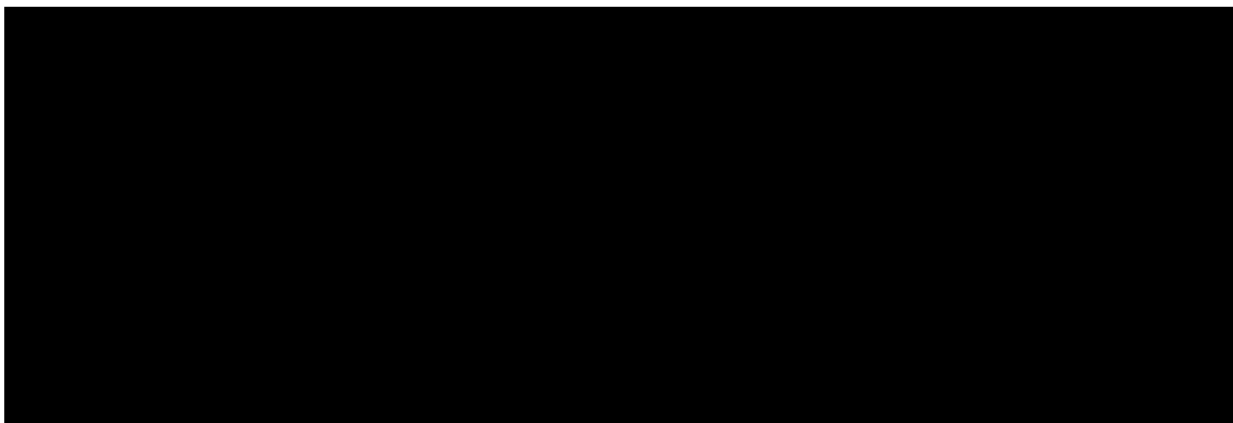
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(2) Work Involved -- Once operational, the actual plotting time and related photo processing would be limited to about 3 hours per month for frame indexes and probably the same for cell coverage.

6. Other Considerations

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7. Recommendation

On the basis of the above considerations, it is recommended that the USGS offer be accepted and that we plot the frame indexes only at this time.

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Assistant for Technical Development  
Basic and Geographic Intelligence

Attachment

As stated in Par. 5. a. (1)

Distribution:

- 1 - D/BGI
- 1 - DD/BGI
- 1 - Ch/CD
- 1 - Ch/CD/T
- 1 - CD/I ( ) 25X1A
- 1 - CD/R ( )
- 1 - Ch/GD
- 1 - Ch/GD/X 25X1A
- 1 - COMIREX ( )

ATD/BGI: ( ) jmc/3334(30 Aug 1973)

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